

# Fish Processing in Singapore

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## Introduction

Singapore consists of the island of Singapore and some 57 islets within its territorial waters. It is located about 136.8 km north of the Equator. The main island is about 41.8 km in length and 22.9 km in breadth and has an area of 570.4 sq km. Its coastline is about 132 km. The total land area is 621 sq km including that of the islets. The population of Singapore is about 2.56 million. Being the largest port in the world in terms of total volume of cargo handling, it is located at the cross roads between the Indian and Pacific Oceans. At the southern tip of Peninsular Malaysia, Singapore is located at the centre of major fish producing countries like Malaysia and Thailand at her north, and Indonesia at her south.

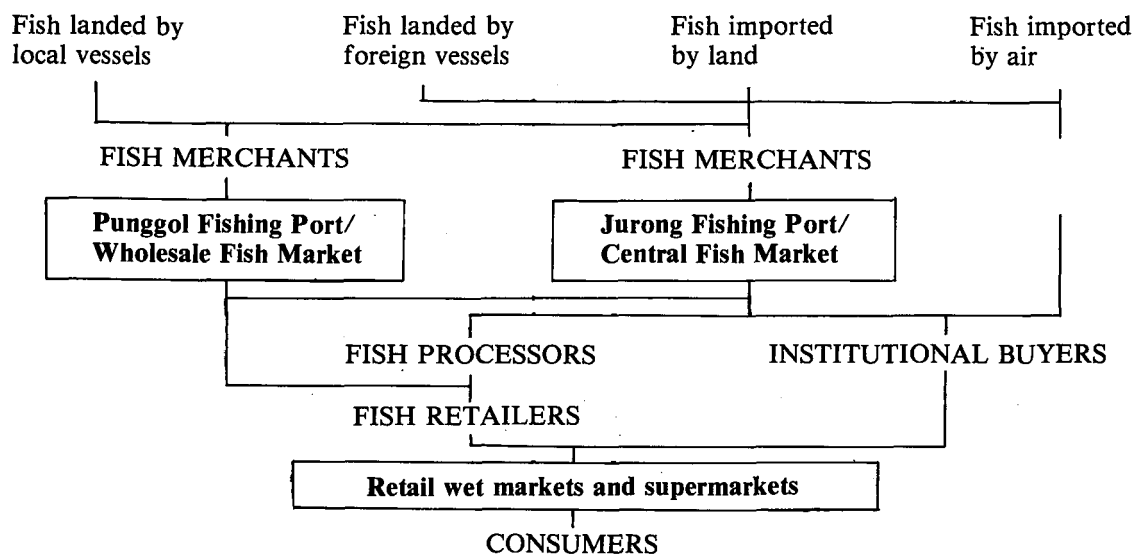
Geographically, Singapore has limited territorial waters which impose constraints on its fishing activities. However, Singapore has developed into a cosmopolitan city state from a fishing village after one and a half century. With a population close to 3 million people,

Singapore today has become one of the countries in Asia with a high per capita consumption of fish of about 32 kg. The local production of about 20,000 tonnes per year hardly meets the demand of the population. Therefore, most of the fish and other fish products are imported; for chilled and fresh fish alone, the import volume is close to some 90,000 tonnes a year.

## Fish Supply Situation

The local catch is landed by trawlers operating in their traditional fishing grounds in the South China Sea. This is supplemented by imports of chilled fish mainly from West Malaysia, Thailand and Indonesia. Those from Malaysia are trucked to Singapore by road. Those from Thailand are imported either in refrigerated container trucks from southern Thai provinces, air-flown to Singapore or landed by Thai fishing vessels. From Indonesia, the fish are air flown to Singapore as well as by fish carrying boats from nearby Indonesian islands. The pattern of imports and distribution of chilled fish is shown in Figure 1.

**Fig. 1. Distribution of chilled fish in Singapore**



Other than chilled, fish are also imported in frozen form. Some 48,000 tonnes of frozen marine fish, prawn and molluscs, and 29,000 tonnes of tuna were imported in 1986.

Most of the fish are consumed in fresh or chilled form in Singapore. The general preference of fresh and chilled fish as diet of the population has supported the existence and development of the local fishery industry. Sufficient marketing facilities such as fishing ports and wholesale fish markets are provided and managed by the Government to ensure fast distribution of fish to the consumers. The same facilities have also contributed to the growth of the fish processing industry in Singapore. With rapid urbanisation and industrialisation for the last decade, consumption of processed and semi-processed fish has been also gaining popularity in Singapore.

### Fish Processing

The fish processing industry in Singapore can be grouped under two categories in terms of the scale of operation, viz factories which are export orientated and manufacture high value added products for overseas markets, and factories which are small and medium in operation-size and make traditional fish products for local demand and regional markets.

Four major groups of fish products can be identified in the local fish processing industry. They are: frozen fish products like fillet, fish jelly products like fishballs and fish cakes, snack food like dried squid and *kerupok*, and seafood delicacies like sharkfin and fish maw.

### Frozen Fish Products

Singapore exported about 30,000 tonnes of frozen fish, fillet and prawn in 1986. Raw materials are generally imported and further processing, involving number of factories, produce fillets and individually quick frozen products.

The large factories have processing areas of 1000 sq m and above, and also good cold storage facilities. They produce mainly frozen fish, fillets, cuttlefish, and prawn for export markets. Proper packaging and quality are important for the products so that they have a competitive edge over other products from other countries in the world markets. These factories normally have proper processing lines equipped with good processing machineries.

They also employ qualified workers to monitor and assure the quality of the products.

Some medium-sized factories also produce frozen fish products for local markets and their products are supplied to restaurants, institutional buyers, supermarkets and merchant shipping vessels. For such factories, processing is carried out as and when there is an order or sufficient supply of raw materials. Normally, the factories are equipped with minimum processing machineries since automation may not be justified for such low volumes of turnover.

### Fish Jelly Products

The consumption of traditional fish jelly products in Singapore has been increasing in the last few years. Fishballs and fish cakes are popular as they are served together with carbohydrate-based foods such as noodles and rice as fast food to the consumers. There are 30 factories manufacturing fish jelly products with an estimated daily production of 28 tonnes. The main products are fishballs, fish cakes with a variety of ingredients, egg rolls, *ngoh hiang* (rolls stuffed with minced fish meat and other meats and vegetables), cuttlefish balls and *young tofu* (soy-based products stuffed with minced fish meat).

Raw materials such as Dorab (*Chirocentrus dorab*) and Coral Fish (*Caesio* spp.) which are traditionally used and known to be good for making fishballs and fish cakes are imported from neighbouring countries through the normal marketing channels as for chilled fish. As these fish are getting more expensive, surimi blocks are imported mainly from Thailand as alternative raw materials. In 1985, some 1,400 tonnes of surimi blocks were imported. There is also a trend for the import of chilled leached meat, fillets and headed and gutted fish for use as raw materials. The industry also use frozen Blue Whiting and Grenadier (fish from cold waters) although their supplies are not regular.

The fish jelly product manufacturing industry started as a backyard industry when the processors were located in the city. As a result of urbanisation, old buildings were demolished and some of these family-run businesses have shifted to light industrial areas. During the resettlement, many processors have chosen to terminate their business. However, most of those who have been resettled are still operating the business on a small scale. Tech-

nically, the industry needs advice on process line quality control, post-processing handling of products and packaging to improve product shelf-life and marketing.

Some mechanisation in fishball and fish cake making have been introduced in the last decade. Processing equipment such as meat-bone separator, grinder, product shaping machines and fryers are now used to replace the labour intensive work in extracting fish meat from the raw materials and subsequent processes in cooking. The final products are either fried or boiled although they are not completely cooked. They are then kept cooled to room temperature and chilled for distribution.

### Snack Food

Snack food production also started from family-run backyard industry like the fish jelly products. The snack food produced from seafood includes seasoned and dried squid, seasoned and baked fish (*satay* fish), fish and prawn crackers. Most of the processing works carried out in the factory are simple. It is due to the fact that the raw materials are already semi-processed. The unfried fish and prawn crackers are imported from neighbouring countries. They are simply fried and later packed in the factory for sale and distribution. Since the semi-processed raw materials are imported, there is no way for the manufacturers to check on their quality which may affect the quality of the finished products.

Similarly, seasoned and dried squid are processed from dried raw materials imported. The raw materials are softened by soaking in water, and then flattened by passing through a series of rollers. Seasoning materials like chilli, sugar, soy sauce and spices are later added followed by drying, baking or broiling.

As the markets for these products are mainly domestic, the processors do not have the incentives to upgrade the methods of processing which may also increase the cost of production. Apparently, the processors are contented with the present status of the industry where some sort of mechanisation is introduced in the packaging of the finished products. Product diversification and development should be looked into to improve the image of the snack food industry using seafood as raw materials.

### Seafood Delicacies

Some dried seafood have long been recognised as health food in the Orient. These include shark fin, sea cucumber, fish maw, abalone and scallop. Such products fetch a high price in the market. For instance, Singapore exported about S\$23 million of dried sharkfin in 1986. The processing of these products is fairly simple and labour intensive. Most of the raw materials required are imported and have already been semi-processed.

The dehydrated raw materials are soaked in water again for cleaning or repeated boiling. High-priced products like sharkfin are usually cleaned manually to get rid of the skin, meat and other foreign materials on the finrays. They are then dried again and packed into consumer packs for sale or export.

### Problems Faced in the Processing Industry

As a net fish importing country, Singapore's processing industry is faced with the problem of supplies of raw materials. Unlike fish processing factories in a fish producing country, the factories have to secure sufficient raw materials to keep the production lines running. Sufficient cold storage facilities must be available to stock up the raw materials in order to offset the fluctuations in supplies.

The manufacturers depending on the import of fish for processing have difficulties in monitoring the quality of raw materials. The role of sourcing and purchasing raw materials has become one of the important activities of the processor. To ensure good quality of the raw materials, some of these are imported by air to Singapore and large quantities are often purchased when the price is right.

The production of high value processed products is to ensure future growth of the industry. Some processing technologies have to be upgraded through the use of modern machineries. Quality has to be emphasised in the finished products to gain competitiveness in the export markets. For domestic market, further improvement in product packaging is needed to extend the shelf-life of finished products and to promote marketing. Concerted effort of the processors is needed to maintain or increase their market shares whether local or

overseas. Otherwise, they will be losing their competitiveness as a result of rising production costs.

### **Government Bodies Regulating The Industry**

The fish processing industry is regulated by the Fisheries Division of Primary Production Department and the Food Section of Ministry of Environment. Thirteen fish processing factories are licensed under the Fish Processing Establishment Rules, 1971 by the Primary Production Department. Regular inspections are conducted to ensure good sanitary practices on the processing premises. The Department also

issues health certificates for exports of fish products manufactured by these factories. For the fish jelly product industry, the Department's Fisheries Postharvest Technology Section often conducts training courses for processors or plant managers to upgrade their knowledge in production and the use of machineries in processing.

Fish processing factories marketing their finished products locally are regulated by the Ministry of Environment under the Environmental Public Health (Food Establishments) Regulations, 1973. This Ministry also regulates the use of additives in food processing under the Sale of Food and Drug Act.